

## **DRAFT notes on history and timelines associated with 2004 West Divide Creek Seep**

*05/09/12 These draft notes were prepared for Garfield County in large part by Science Based Solutions LLC. Timeline is under review and subject to additional input and verification from individuals and agencies with knowledge of activities associated with the West Divide Creek Seep.*

Recent questions were raised by Lisa Bracken concerning continuing problems at the West Divide Creek (WDC) site. Specifically, Ms Bracken asked what the County and State has done about the seep and if the recommended actions in the 2008 report by Science Based Solutions have been completed. A list of events and responses was compiled with annotations covering the period from 2004 to the present. The list shows that both the State and County have devoted considerable time and effort to the West Divide Creek and surrounding area.

Another aspect of the seep is the current situation regarding discharge of methane and associated hydrocarbons. The data show that the West Divide Creek seep levels of methane and benzene started to decline in early 2004 with the initiation of remediation activities. **The benzene levels in the groundwater monitoring wells have continued to decline and currently, the benzene levels are reaching the regulatory maximum value (5µg/l) based on the most recent available data from the COGCC website (September 2011) as predicted in the 2008 report.** Methane levels continue at the same concentrations and oscillate seasonally with the values depressed during the spring runoff, and then increasing to peak in the winter samples. The isotopic data for methane from the 2004 seep and the presence of associated hydrocarbons with most methane samples indicate the source continues to be thermogenic with little or no contribution from biogenic sources.

Finally, there were three recommendations in the 2008 report, of which two were in part related to West Divide Creek. These recommendations were 1) that the County should design and contract the Phase III study to continue supplement basic monitoring activity by COGCC with targeted monitoring of sites with increasing concentrations of parameters indicating impact, and 2) that the County may wish to investigate regulatory guidelines and relevant examples of dealing with cumulative impacts to water quality in addition to traditional point source contamination that exceeds regulatory standards. The County has designed and contracted the Phase III monitoring well installation with two rounds of water samples already collected and under review. I do not know what actions the County has taken regarding the second recommendation, however, that recommendation is not focused on West Divide Creek.

## West Divide Creek Actions and Timeline

- 2004 COGCC took samples in 2004 after complaints from residents about bubbling in West Divide Creek.
  - Determined there was contamination of stream with Benzene above MCL.
- 2004 COGCC issues moratorium on further drilling within 2 miles of Schwartz 2-15B well.
- 2004 COGCC held hearing in 2004 based on data showing impact to surface water.
  - EnCana stipulated they were at fault.
- 2004 COGCC fined EnCana for violations.
  - Fine was \$380,000.
  - COGCC directed EnCana to install and sample monitoring wells to fully delineate the extent of seep.
  - EnCana installed monitoring wells.
  - **Implemented remedial activity (air sparging) in 2005.**
  - COGCC on-line posting of results of sampling monitoring wells at WDC, 2004-2012.
- 2004 COGCC issues Cementing NTO for Mamm Creek Field Area in response to EnCana issues.
- 2005 **Garfield County (GarCo) applied for fine funds to conduct study.**
  - **County decided that fine would be used for baseline hydrogeological study of Mamm Creek area.**
  - County convened panel to formulate RFP.
- 2005 **GarCo bid Hydrogeologic Characterization Study, reviewed applicants and selected prime contractor.**
  - **Awarded to URS.**
- 2005 **GarCo contracted URS to perform Phase I Hydrogeologic Characterization Study.**
  - **County coordinated with COGCC, EnCana and URS to begin study and ensure access to EnCana data.**
- 2006 Producers in area ask for moratorium to be lifted.
- 2006 **GarCo intervened** on behalf of residents in COGCC hearing to lift drilling moratorium.
  - COGCC held hearing to allow all stakeholders chance to comment.
  - COGCC lifted moratorium on drilling.
  - Proposed special drilling rules for the area.
- 2006 GarCo met with COGCC to review Phase I results and formulate Phase II study scope of work.
  - **Several meetings between GarCo and COGCC where GarCo position was there had been no systematic review of Phase I results to establish safety of further drilling.** COGCC position was they had spent a great deal of effort and felt the remediation of the leaking well and continued air sparging at WDC and monitoring were sufficient.
- 2006 GarCo met with COGCC to review proposed special drilling area instructions and attended COGCC hearing.

- **GarCo** asked to see basis for establishing the zone, COGCC said they had information compiled by Jamie Atkins, but he had left COGCC. Instead of data they offered a presentation outlining proposed rule, but did not produce the data.
- 2006 COGCC formally issued Phase I report.
- 2006 GarCo met with COGCC to discuss results of Phase I report and differing opinions on State and URS positions. **GarCo raised concerns about persistent elevated bradenhead pressures.**
  - **GarCo** and COGCC failed to reach consensus. County felt there was more to be done and background sampling showed some impact to water wells. State did not agree. County expressed concern about persistent elevated bradenhead pressures.
- 2007 **COGCC issued Special Drilling Area Notice to Operators (NTO) instructions.**
  - **This supplements the original 2004 NTO**, identified and designated portion of Mamm Creek field as East Mamm Creek area **and detailed increased monitoring of cementing and reporting of drilling anomalies and elevated bradenhead gas for wells in that area.**
- 2006 – **GarCo issued bids for Phase II study.**
  - Phase II awarded to S.S. Papadopolus. & Assoc.
- 2008 – **GarCo BOCC reviewed summary of results for Phase I and II report.**
- 2008 – **GarCo presented** Phase I and II results to concerned residents in meeting (Silt).
- 2008 **GarCo released report** summarizing Phase II results and recommendations.
  - GarCo consultant Thyne concluded there was some impact to water wells from methane leaking from gas wells and produced water spillage at surface.
- 2008 COGCC issued review of GarCo report.
  - Report by SS Papadopolus disagreed with some points in GarCo (Thyne) 2008 report.
- 2009 **In response to continued resident complaints, GarCo held BOCC hearing to review actions to date.**
  - **GarCo BOCC agreed to have consultant review complaints by resident and prepare presentation for COGCC.**
- 2009 COGCC held information hearing in Glenwood Springs on issues including West Divide Creek, COGCC **and GarCo presented views including evaluation of WDC quarterly monitoring data.**
  - Several consultants hired by producers and COGCC refuted conclusions of 2008 report and insisted that there was no detectable impact to water wells from gas drilling and production activities. All impact was natural background or stray gas from Wasatch uncased portions of well.
  - **GarCo supported effort to have COGCC review WDC and explain why the seep was continuing at constant rate rather than subsiding as projected.**
  - **GarCo re-stated concerns with persistent elevated bradenhead pressures.**
  - **GarCo asks producers to define Wasatch contribution from intermediate uncased intervals.**
- 2009 **GarCo formulated, issued, bid and started Phase III Study.**
  - Deep monitoring wells (3) were installed in early 2010.

- Intent was to provide data from deeper Wasatch intervals.
- 2010 **GarCo BOCC held hearing in the fall to further review WDC and summarize data.**
  - **Commissioners felt all reasonable effort has been made and wanted to wait and see what the COGCC would do.**
- 2010 **GarCo** meets with COGCC to review proposed WDC actions by COGCC in response to 2009 hearing.
  - COGCC sticks to position that WDC has been successfully remediated and concentrations will continue to decline with time.
- 2010 COGCC commissions review of drilling problems in *East Mamm Creek Project Drilling and Cementing Study* with Crescent Consulting (CC) **in response to GarCo complaints.**
  - Initial meeting with County, Crescent and COGCC ends with COGCC declaring that the Schwartz 2-15B wells will not be included in the study.
- 2010 **COGCC issues NTO for Mamm Creek and Rulison Fields for monitoring and reporting elevated bradenhead pressures requiring remedial activity if pressure reaches 250 psi.**
- 2010 **GarCo Phase III study drilled three sets of nested wells to sample deeper groundwater near WDC.**
  - 2011 COGCC memo on conclusions and recommendations of COGCC-sponsored Crescent Consulting, LLC report *East Mamm Creek Project Report Drilling and Cementing Study* is issued.
  - Cementing Study report notes there have been five wells drilled between 2003 and 2004 with gas migration problems including gas in water wells, surface seeps and seeps in creeks and ponds.
  - **Cementing study Memo concludes study showed the improved drilling and cementing NTO's have been successful in East Mamm Creek Project Area (EMCPA).**
  - Memo notes there are still challenges to drilling in area included loss of circulation, gas bumps and loss of cement.
  - Memo acknowledges there are shallow gas zones and intermediate gas zones that can make completions difficult and should be identified and isolated prior to completion.
  - **COGCC acknowledges that venting bradenheads with persistent pressure from flow in intermediate zones is acceptable remediation.**
  - COGCC acknowledges there were several recommendation to further improve rules and will consider implementation in future NTO's.
  - COGCC will consider extending rules to wider area than East Mamm Creek after review.
  - **2011 GarCo initiated** review of draft data from Phase III hydrogeological study to evaluate need for continued sampling of the 3 well nests prior to report generation.
- 2012 **GarCo approves additional sampling and report preparation for Phase III hydrogeological study**
- 2012 Citizen compliant concerning County inaction on West Divide Creek.

- **GarCo** tasks Oil and Gas Liaison and geological consultant with reviewing past actions on WDC and preparing list of previous actions, problems and results, and potentially needed further actions such as new monitoring in the West Divide Creek area.

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